

EFFECTS OF RAINFALL, SLOPE, AND VEGETATION
HEIGHT ON RUNOFF WATER QUALITY FROM
FESCUE PLOTS TREATED WITH
POULTRY LITTER

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CHAPTER I

INTRODUCTION

BACKGROUND

Land application of poultry litter to permanent pasture is a widely spread and accepted method of disposing of poultry waste. The poultry industry has seen significant growth in recent years all across the Southeast. Poultry production recently has expanded into Eastern Oklahoma and represents major economic opportunity for the region. Because tourism and recreation has been a vital portion of Eastern Oklahoma's economy, poultry production and associated water quality concerns and the impact on Oklahoma's recreational waters are the focus of many researchers. As a fertilizer, poultry litter is a valuable source of nutrients and can greatly increase forage yields and productivity. In terms of the nutrient constituents that are capable of being utilized by plants, there is comparatively more phosphorus in poultry litter than other types of animal wastes. In other words, poultry litter is typically higher in phosphorus than is required by growing plants if the litter is applied on the basis of nitrogen needs. This is the fundamental problem associated with poultry litter in terms of water quality. Applying litter on the basis of nitrogen needs is also accompanied by phosphorus applications that often exceed crop needs. Having phosphorus levels above that which can be utilized by plants poses a

potential threat to water quality. Streams and rivers which receive runoff waters from land where poultry litter has been applied are of special concern as well as receiving lakes which serve as phosphorus sinks. For most freshwater systems, including those in Oklahoma, phosphorus is a major limiting nutrient for aquatic algae. Increasing phosphorus loads in these waters enhances aquatic productivity and thus incipient eutrophication can result.

In 1990, the USDA Soil Conservation Service (SCS) in Oklahoma established guidelines for animal waste application based on phosphorus. They recommended that broiler litter applied to permanent pastures should not exceed 200 kg/ha P_2O_5 per year on soils less than 15 percent slope. These guidelines increased the land requirements for litter application and reduced the land available for disposal. For most areas of the country where poultry production thrives as an industry there are few other agricultural alternatives. These areas are usually hilly, rocky terrain and to find suitable disposal sites of less than 15 percent can be difficult - especially if poultry litter applications cannot exceed 200 kg/ha P_2O_5 per year.

A recently completed field study, funded by the Soil Conservation Service (SCS), identified significant parameters affecting the magnitude of the constituents in surface runoff resulting from the land application of poultry litter onto permanent pasture (Huhnke et al., 1993; Storm et al., 1993). This study evaluated the affects of poultry litter application rate, slope, and vegetation condition on nutrient losses in runoff. The results from the field study indicate a high degree of variability within the data. This suggested a need for more controlled conditions.